

**California Regional Water Quality Control Board
San Diego Region**

**Total Maximum Daily Load (TMDL) for Metals
Chollas Creek Watershed**

**Draft Numeric Target
May 10, 2000**

Numeric Target

For the past several years, there have been no state or federal water quality objectives or criteria for heavy metals that were directly applicable to Chollas Creek. The U.S. Environmental Protection Agency (USEPA), however, promulgated Title 40, Part 131.38 of the Code of Federal Regulations (40 CFR 131.38), "Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" in April 2000. 40 CFR 131.38 is also known as the California Toxics Rule (CTR). Numeric criteria for copper, lead and zinc, as well as other metals, are established in the CTR, and its water quality criteria are applicable and enforceable in California. Therefore, water quality criteria in the CTR have been chosen to establish the numerical targets for Chollas Creek.

The CTR's freshwater criteria for copper, lead and zinc are expressed as a function of hardness (mg/L) in the water column. The Criteria Maximum Concentration (CMC) are acute criteria that estimate the highest concentration of a material in surface water to which an aquatic community can be exposed briefly without resulting in an unacceptable effect. The Criteria Continuous Concentration (CCC) are chronic criteria that estimate the highest concentration of a material in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The USEPA recommends that freshwater criteria for metals be expressed in terms of the dissolved metal concentrations in the water column and are calculated by using the total metal concentration and a conversion factor. The term "Conversion Factor" (CF) represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. Criteria may be calculated from the following equations and Tables 1 and 2 below:

$$\text{CMC (dissolved in } \mu\text{g/L)} = \exp \{ m_A [\ln(\text{hardness})] + b_A \} (\text{CF})$$

$$\text{CCC (dissolved in } \mu\text{g/L)} = \exp \{ m_C [\ln(\text{hardness})] + b_C \} (\text{CF})$$

(Note: In the CTR, a water effects ratio (WER) is included as a multiplier in the above calculations for water with hardness of greater than 400 mg/L; hardness in Chollas Creek is consistently below 400mg/L, so the WER has not been included in the above calculations.)

Table 1: California Toxics Rule Equation Parameters

Metal	m_A	b_A	m_C	b_C
Copper	0.9422	-1.7	0.8545	-1.702
Lead	1.273	-1.46	1.273	-4.705
Zinc	0.8473	0.884	0.8473	0.884

Table 2: California Toxics Rule Conversion Factors (CF) for Freshwater

Metal	CF for CMC	CF for CCC
Copper	0.96	0.96
Lead	1.46203- [ln(hardness)*(0.145712)]	1.46203-[ln(hardness)* (0.145712)]
Zinc	0.978	0.986

The hardness in Chollas Creek storm water varies roughly from a low of 50 mg/L to a high of 150 mg/L. In order to establish numeric targets for Chollas Creek, water quality criteria have been calculated assuming an average hardness of 100 mg/l. Criteria were rounded to two significant figures. Table 3 contains acute and chronic water quality criteria that will be applied to Chollas Creek as numeric targets.

Table 3: Numeric Targets for Chollas Creek

		Total Recoverable		Dissolved Fraction	
Metal	Hardness	CMC (mg/l)	CCC (mg/l)	CMC (mg/l)	CCC (mg/l)
Copper	100	14	9.3	13	9.0
Lead	100	82	3.2	65	2.5
Zinc	100	120	120	120	120

The USEPA recommends that the dissolved fraction of a metal be used to determine whether or not criteria are being met. In the event that only total recoverable metals are measured, however, the total result will instead be used to determine if total recoverable criteria have been met. For the purpose of evaluating if the numeric target has been attained, the following provisions shall be applied:

1. If only one sample is collected during the time period associated with the numeric target (e.g., one-hour average or four-day average), the single measurement shall be used to determine attainment of the numeric target for the entire time period.

2. The one-hour average shall be the moving arithmetic mean of grab samples over the specified one-hour period.
3. The four-day average shall apply to flow-weighted composite samples for the duration of a storm, or shall be the moving arithmetic mean of flow weighted 24-hour composite samples or grab samples.

If these proposed numeric targets in Table 3 are achieved, storm water in Chollas Creek should meet CTR criteria as well as Basin Plan toxicity objectives.